

In the Claims:

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1 26. A temperature control system for controlling a temperature of a substrate
2 in an atomic layer deposition system, said temperature control system
3 comprising:
4 a deposition chamber;
5 a vacuum pump coupled to said deposition chamber;
6 a substrate holder located within said deposition chamber, said substrate
7 holder having a passageway for flowing a backside gas into a space between
8 said substrate holder and said substrate on said substrate holder;
9 a gas inlet coupled to said deposition chamber; and
10 an energy source for heating by irradiation said substrate on said substrate
11 holder.

1 27. The temperature control system of claim 26, further comprising a means
2 for valving and controlling a pressure of said backside gas.

1 28. The temperature control system of claim 26, wherein said substrate holder
2 is an electrostatic chuck.

1 29. The temperature control system of claim 28, wherein said electrostatic
2 chuck has a means for flowing a fluid therein.

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1 30. The temperature control system of claim 29, wherein said electrostatic
2 chuck has a cooling capacity of between about $200 \text{ W/m}^2 \text{ }^\circ\text{K}$ and $350 \text{ W/m}^2 \text{ }^\circ\text{K}$.

1 31. The temperature control system of claim 29, wherein said electrostatic
2 chuck has a cooling capacity of at least $200 \text{ W/m}^2 \text{ }^\circ\text{K}$.

1 32. The temperature control system of claim 28, wherein there is a space
2 between said substrate and said electrostatic chuck.

1 33. The temperature control system of claim 26, wherein said energy source
2 for heating said substrate is a rapid thermal processor.

1 34. The temperature control system of claim 33, wherein said substrate is
2 heated with a temperature ramp rate of about between $100 \text{ }^\circ\text{C}$ per second and
3 $300 \text{ }^\circ\text{C}$ per second.

1 35. The temperature control system of claim 33, wherein said substrate is
2 heated with a temperature ramp rate of at least $100 \text{ }^\circ\text{C}$ per second.

1 36. The temperature control system of claim 33, wherein a source for said
2 rapid thermal processor is a graphite heater.

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1 37. The temperature control system of claim 33, wherein a source for said
2 rapid thermal processor is a plasma arc.

1 38. The temperature control system of claim 33, wherein a source for said
2 rapid thermal processor is at least one tungsten halogen lamp.

1 39. The temperature control system of claim 26, wherein said energy source is
2 selected from the group consisting of a laser, an electron beam source, and an x-
3 ray source.

1 40. The temperature control system of claim 39, wherein said substrate is
2 heated with a temperature ramp rate of about between 200 °C per second and
3 700 °C per second.

1 41. The temperature control system of claim 39, wherein said substrate is
2 heated with a temperature ramp rate of at least 200 °C per second.

1 42. The temperature control system of claim 39, further comprising a means
2 for scanning an output of said energy source over a surface of said substrate.

1 43. The temperature control system of claim 39, further comprising a means
2 for scanning said substrate relative to an output of said energy source.
